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ferent situations from the majority of the species of the genus to which they belong, or even have the faculty of living in several different situations. Thus, although the animals inhabiting the shells belonging to the genera *Patella* and *Lottia* are extremely dissimilar in many essential features of their organization, the shells they form cannot be distinguished from one another by any known character. In other instances, when the animals are very different, the distinctive characters of the respective shells belonging to them are so slight as to be insufficient for the purpose of classing them under separate species ; and this difficulty of discrimination must be much increased in the cases of fossil shells, especially of those which have no strictly analogous forms among recent shells.

In support of the position advanced in the second part of the paper, namely, that numerous exceptions occur to the identity of habitation among all the species of the same genus of conchiferous Mollusca, the author adduces examples : 1st, where the species of a genus are found in more than one situation, as on land, in fresh and in salt water ; 2ndly, where one or more species of a genus, the species of which generally live in fresh water, are found in salt or in saltish water ; 3rdly, where one or more species of a genus, which is generally found in the sea, are, on the contrary, found in fresh water ; and, 4thly, where the same species of shell is found both in salt and in fresh water.

“ On the supposed Existence of Metamorphoses in the Crustacea.”
By J. O. Westwood, Esq., F.L.S. and Secretary to the Entomological Society. Communicated by J. G. Children, Esq., Sec. R.S.

The author refers the principal modifications of form which occur during the progressive development of animals to the three following heads : 1st, that of an animal produced from the egg in the form which it is destined to retain through life, its only change consisting in a series of moultings of the outer envelope, attended merely by an increase of size, and not by the acquisition of new organs ; 2ndly, when the animal, at its exclusion from the egg, exhibits the form which it continues to possess, subject to a series of moultings, during several of the last of which certain new organs are gradually developed ; and, 3rdly, when the form of the animal, at its exclusion from the egg, is totally different from that under which it appears at the later periods of its existence ; such change of form taking place during two or three of its general moultings, and consisting, not only in the variation of the form of the body, but also in a complete change in the nutritive and digestive systems, and in the acquisition of various new organs. This last phenomenon peculiarly characterizes what is termed a *metamorphosis*.

It is the received opinion among naturalists that the Crustacea do not undergo metamorphoses, properly so called, and that the transformations they exhibit consist merely in the periodical shedding of the outer envelope. The object of the present paper is to establish the correctness of this opinion, in opposition to that of Mr. J. V. Thompson, who has laid claim to the discovery that the greater number of the animals belonging to the class Crustacea actually undergo

metamorphoses of a peculiar kind, and of a different character from those of insects. Mr. Thompson's views are founded upon some circumstances which he has observed in certain animals of the genus *Zoea* of Bosc, and which have been recorded by Professor Slabber, and which have led Mr. Thompson to believe that, of these animals, some were the young of the *Cancer Pagurus*, or common crab, and others the young of the *Astacus Pagurus*, or common lobster; and these views are supposed by him to be corroborated by the annual peregrinations of the land crabs to the sea-side, for the purpose of depositing their eggs, rendered necessary by the aquatic habits and conformation of the young. The author proceeds to examine at length the arguments on which Mr. Thompson has founded these opinions, and adduces his reasons for concluding that they are erroneous, and that no exception occurs to the general law of development in the Crustacea, namely, that they undergo no change of form sufficiently marked to warrant the application to them of the term *metamorphosis*.

“Memoranda relating to a Theory of Sound.” By Paul Cooper, Esq. Communicated by J. G. Children, Esq., Sec. R.S.

The author, expressing his dissatisfaction with the commonly received theory of the propagation of sonorous undulations by an elastic medium, advances the hypothesis that each particle of an elastic body, after receiving an impulse in a particular direction, and communicating that impulse to the adjoining particle, instead of being thereby brought to a state of rest, is carried back by its elasticity with a velocity which continues its motion beyond the point from which it originally set out, and is thrown into continual vibration, in a manner analogous to the motion of a pendulum. He endeavours, on the principle of a continual transfer of the state of each particle to the adjacent particles, to explain the phenomena of continued sound arising from a prolonged succession of vibrations.

“A Theory of the Tides, including a Theory of the Formation and Propagation of Waves.” By the same.

The author applies the principle announced in his paper on the Theory of Sound, namely, that of a continual transfer of state between the adjacent atoms of a medium, to the case of oscillating columns of fluid, constituting waves and tides.

“On the influence of the Respiratory Organs in regulating the Quantity of Blood within the Heart.” By James Wardrop, Esq. Communicated by the Hon. Captain De Roos, R.N., F.R.S.

The author observes that the act of inspiration tends not only to favour the passage of the blood into the *venæ cavæ*, but also to detain it in the pulmonary vessels,—in consequence of the expansion of the lungs allowing of its more ready ingress into the pulmonary arteries, and impeding its exit by the veins—and thus retards its return to the heart. On the other hand, the collapse both of the lungs and of the parietes of the chest, during expiration, assists the transmission of arterial blood from the lungs into the left cavities of the heart, and